

BANDIPUR NATIONAL PARK

THE FORESTS

- K.A. BHOJA SHETTY, IFS(Retd)

The main factors which determine vegetation types are:

- (a) Climate namely, temperature and rainfall,
- (b) Soil and
- (c) Biotic, that is influence of man and animals.

Classification of vegetation types is generally based on climatic zones and morphological features of vegetation. However, within the same climatic zone, edaphic variants may be found. Such changes in vegetation are chiefly caused by soil variations.

TROPICAL FORESTS

The tropical forests of India may be broadly classified into the following seven groups.

- 1. Wet evergreen forests - Dense, tall forest; entirely evergreen or nearly so.
- 2. Semi-evergreen forests - Dominants include deciduous species but evergreens predominate.
- 3. Moist deciduous forests - Dominants mainly deciduous but sub-dominants and lower storeys largely evergreen. Top canopy rarely dense and even but over 25 m. high.
- 4. Littoral and swamp forests - Mainly evergreen of varying density and height but always associated predominantly with wetness.
- 5. Dry deciduous forests - Entirely deciduous or nearly so. Top canopy rather light and rarely over 25 m. high, usually 8-20 m.

6. Thorn forests - Deciduous with low thorny trees and xerophytes predominantly. Canopy more or less broken. Height under 10 m.
7. Dry evergreen forests - Hard leaved evergreen trees predominate with some deciduous emergents, often dense; usually 20 m. high.

TOPOGRAPHY

The land is undulating, broken by chains of hills and flat topped hillocks and water courses. Elevation ranges from about 800 m. to the highest peak, Gopālaswamy betta, which is 1455 m. The altitude at Bandipur is 996 m.

WATER SUPPLY

In the North-Western portion, rivers Moolehole (Nugu) and Kabini flow. The Eastern portion is drained by the rivers Moolehole (Nugu) and Moyar and their tributaries. The river Moyar cuts into a gorge, 260 m. deep, between Bandipur National Park and Mudumalai Wildlife Sanctuary. There are also a number of water holes in the national park.

SOIL

Soils commonly found in the area are:

- (a) Clayey soil of black colour, generally deep and mixed with nodular lime stone.
- (b) Grey or red sandy loam on slopes and other well drained areas.

CLIMATE

Three seasons are markedly noticed - the dry, the wet and the cold. The cold season starts in November and lasts up to mid February. Thereafter the hot season commences and lasts upto middle of June. The coldest months are December and January, when the minimum temperature is about 17°C. The hottest months are March and April when the maximum temperature goes upto 29°C.

Contd..3)

The wet season starts in the middle of June, though premonsoon showers fall in April and May. The South-West Monsoon continues upto September. After a break, the North-East Monsoon brings rain during October-November.

Annual rainfall is heavier in the Western part of the park and decreases towards the Eastern and Northern portions.

The Average annual rainfall at Kalkare is 1270 mm., and at Bandipur - 910 mm.

VEGETATION

The vegetation is markedly influenced by the amount of rainfall received and it ranges from scrub type in the Eastern part with low rainfall, to the moist deciduous type in the Western region with heavier rainfall.

The principal forest types are:

- (a) Scrub type.
- (b) Southern Tropical dry deciduous type.
- (c) Southern Tropical moist deciduous type.

SCRUB TYPE

This type is mainly confined to the Eastern portion, that is, Moyar State Forest which has poor rainfall and impoverished soil, it is characterised by stunted tree growth and open canopy. Common trees found are Shorca talura (jalari) Santalum album (Sandal) Terminalia Chebula (alala) Anogeissus latifolia (dindiga) Azadirachta indica (neem), Chloroxylon swietenia, Acacia levcophloea (bilijali), Acacia Catechu (katchu), Stereospermum chelenoides, Zizyphus spp., Diospyros melanoxylon (tumri) Diospyros montana (jagalaganti).

Lantana, Cassia Uriculata, Cassia tora, Desmodium form the undergrowth. Phocnix humilis is found in some places. Bamboos are generally absent.

SOUTHERN TROPICAL DRY DECIDUOUS TYPE

This type is confined to the central portion. The soil is shallow and rainfall low (800 mm - 900 mm.). Quality of tree

growth is relatively poor and the canopy is open.

The top canopy consists of Anogeissus latifolia (dindiga), Tectona grandis (teak), Terminalia tomentosa (mathi) Terminalia belerica, Terminalia paniculata (hunalu) Pterocarpus marsupium (honno), Dalbergia latifolia (rosewood) Grewia tiliaefolia (tadasalu), Salmalia malabarica (buruga) Gmelina arborea etc.

The lower storey consists of Randia dumentorum, Randia ulginosa wrightia tinctoria Zizyphus spp., Santalum album Cassia fistula (amaltash) Shorea talura (jalari). The undergrowth

The undergrowth consists of mostly grasses, with thickets of Lantana and Eupatorium here and there. Other species commonly found as undergrowth are Helicteres isora, Desmodium, Cureuma.

Bamboos are rarely seen.

SOUTHERN TROPICAL MOIST DECIDUOUS TYPE

This is the most luxuriant and commercially valuable forest in the national park. Several tree species are common to both dry deciduous and moist deciduous types, but, they attain better growth in the moist deciduous forests. The species of the top canopy are Tectona grandis (teak), Lagerstroemia lanceolate (nandi), Terminalia tomentosa (mathi), Terminalia belerica, Dalbergia latifolia (rosewood), Pterocarpus marsupium (honno) Salmalia malabarica (buruga), Adina cordifolia (yethiga) Grewia tiliaefolia (tadasalu) Anogeissus latifolia (dinidga). Stereospermum Xylocarpum Schleichera obosa, Ficus spp., etc.

The lower canopy consists of Embllica officinalis (nelli) Mallotus philippinensis, Kydia calycina, butea monosperma Zizyphus spp., Bauhinia racemosa, Cassia fistula, Randia dumetorum etc.

Undergrowth indulges grasses, Helicteres isora, Solanum spp., Holarrhena autidysenterica, Cantana Eupatorium, Desmodium, Flemingia.

The following two sub-types are also found.

a) Swamp sub-type: Found in water logged areas with stiff, caleyey soil. These are open grassy areas with occasional trees such as Randia Ulginosa, Butea monosperma, Ternimalia tomentosa, Caryea arborea, Zizyphus Xylophyrus, Phoenix humilis.

b) Shorea talura sub-type: Pure patches of shorea talura are occasionally found, in the dry deciduous as well as in the moist deciduous zones.

COASTAL ECOSYSTEMS OF THE KARNATAKA STATE, INDIA

II. BEACHES

(*Psammophytes*)

(*Floristics, Conservation & Management*)



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The Karnataka Association for the Advancement of Science was started in 1981 and registered in 1982. It has accomplished a great deal of research activities over the past 2 decades since its establishment. It is almost exclusively covering Eco-centric, and Socio-centric problems. This is being enriched by its outreach activities to promote educational programmes.

The main core programme is on Mangroves, orchids, Hydropowers, Biovillage, Biomining, Beaches, Coastal CRZ issues. Biodiversity, EIA and EMP studies of submersible areas. In the ongoing research work attention is given to conservation and sustainable use of biological resources. As a part of the programme, attempts have been made for ex-situ conservation in the form of orchidaria, littoral arborea and sea shore gardens.

KAAS seeks the collaborative research activities with the other Environmental agencies to work with them to provide us with the benefit of their concern.

The other objective of the Association is to provide an umbrella to retired scientists to enable them to continue their scientific activities. So far, 5 students of Bangalore University, Botany Department and ten students of Kalayani and Calcutta universities of West Bengal have obtained under the guidance of Dr. T. Ananda Rao their doctorate and pursuing research work in USA, Canada and Australia. In addition to research activities the Association is also conducting orientation programmes to candidates taking the NTS and NET examinations.



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Plate 1 : **Fig. 1.** *Spinifex littoreus* – A robust grass, woody at the base but has herbaceous running branches; Spherical heads bearing female flowers with protruding awns. **Fig. 2.** Shrubby *Scaevola sericea* covering the landward margin of the sandy backshore at Kundapur, Udupi taluk. Formation in dense patches. **Fig. 3.** A quadrat study of *Spinifex littoreus* along the sandy backshore at Kodi beach, Kundapur taluk - Estimation of percentage coverage within a quadrat.

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Plate 2 : Fig. 1. *Salvadora persica* growing on the banks of the Aghanashni river, bearing Juicy fruits. Fig. 2. *Salvadora persica* formation at St. Mary island (off shore island). Fig. 3. *Cerbera odollam* along the banks of the Gurple river (white flowers with yellow throat)



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Plate 3 : **Fig. 1.** A largely eroded beach at Udyavara with stone wall at the seaward margin of the narrow backshore. **Fig. 2.** Rocky outcrop with algae along the foreshore at Someshwara – Ullal beach. **Fig. 3.** A lateral view of the Udyavara beach depicting the unequal width of the foreshore due to the prevailing erosion.

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Plate 4 : Fig. 1. A panoramic view of the elevated castle like formation of columnar rocks, under low tide at the St. Mary Island (Coconut island). Fig. 2. Rocky platform composed of exposed columnar rocks under high tide at the St. Mary island (Coconut island). Fig. 3. *Salvedora persica* formation along the innerside of the rocky backshore of the St. Mary island.



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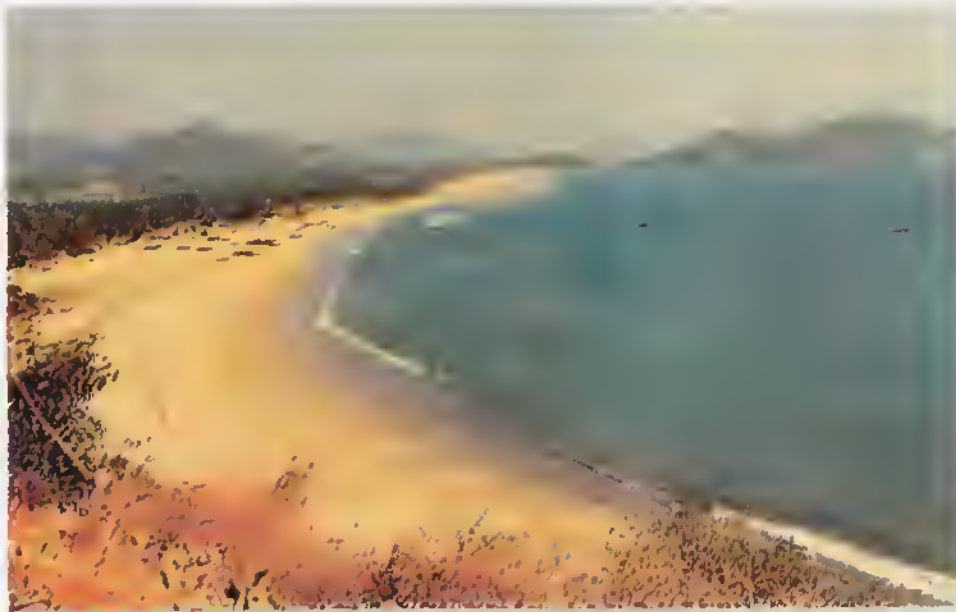
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Plate 5 : Figs. 1 – 3, Despoliation due to Nature-wave Effect. Natural castle like formation and benches formed out of columner rocks at St. Mary island.

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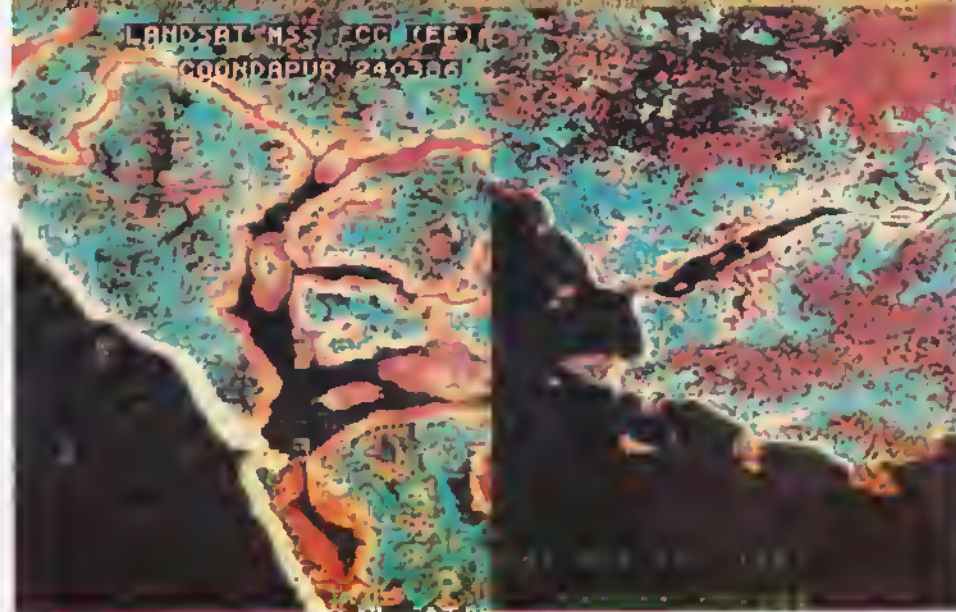


Plate 6 : Fig. 1. Crescent shaped Binaga beach with a narrow foreshore. Fig. 2. A sector of Binaga beach with hilly cliff and open spaced backshore with inland vegetation. Fig. 3. Landsat MSS band 7, 2x, 3x from FCC. Enhancement of Varied features around Kundapur; Chakra – Kollur – Haladi estuarine complex. Fig. 4. Landsat MSS edge enhance FCC (EE) of Karwar area – Kalinadi



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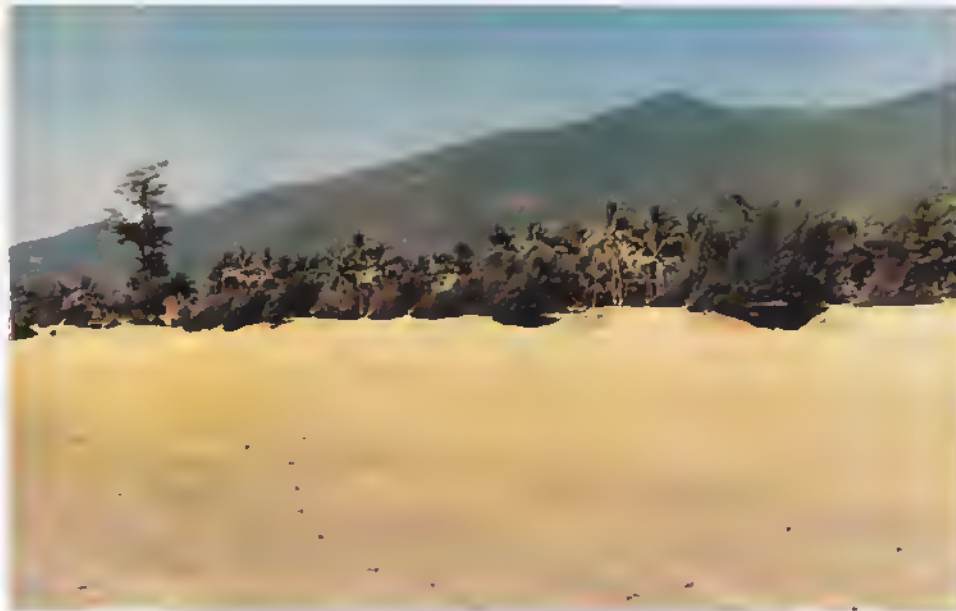


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Plate 7 : Fig. 1. *Erythrina indica* in flowers along the backshore of Ambakodar beach. Fig. 2. OM Beach near Gokarna. Fig. 3. Semi-lunar backshore at Kodar partly rocky and partly sandy.



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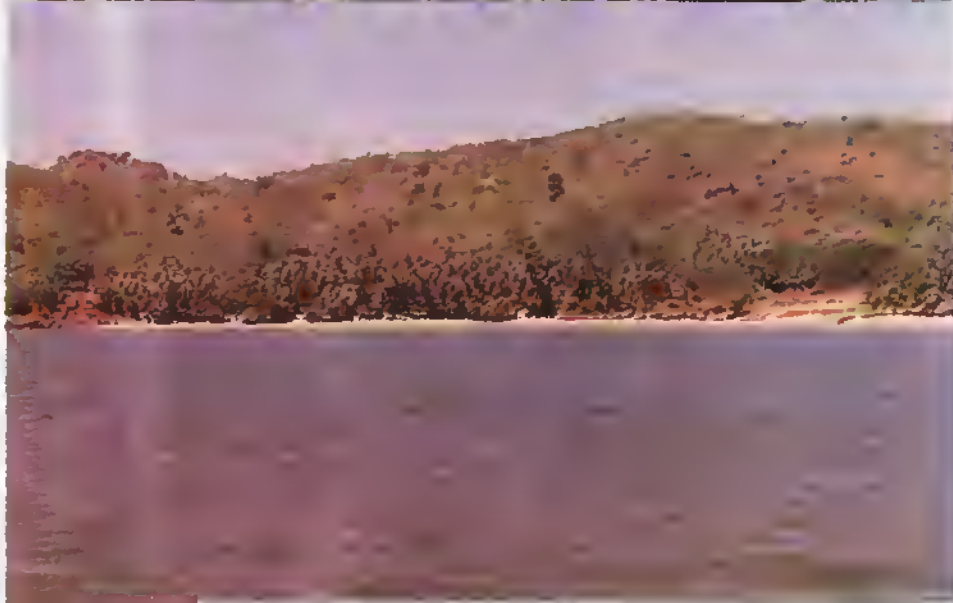


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Plate 8 : **Fig. 1.** A sector of beach of Arga with casuarina and palm trees at the backshore. **Fig. 2.** A closer look of the narrow pocket beach at Chendiya



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Plate 9 : Fig. 1. *Morinda citrifolia* closely set in the vicinity of solidified lava columns in the coconut island (St. Mary's island) Fig. 2. A portion of not-so-wide beach of Ambakodar with dense vegetation at the backshore.



Plate 10 : Figs. 1 & 2. Picturesque flat-beach of Karwar with hilly cliff at one end. Fig. 3. Narrow beach of Gokarna with coconut plantation at the backshore.

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Plate 11 : Figs. 1 – 3. Sun drying of non-oil bearing sardines in a net, to protect from birds. Fig. 4. lateritic bricks stocked along the beach of Kundapur.

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Plate 12 : Figs. 1 & 2. Salt pans at Tadri. Fig. 4. Quarrying stones near Ullal beach.

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Plate 13 : Figs. 1 – 3. Collection of clay from the Kodi lagoon bed. Thus collected clay is exposed to air before being used as a **cat clay** manure to paddy or coconut fields.

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Plate 14 : Fig. 1. Vat with the crude oil of Sardines before boiling along the beach. Fig. 2. A Tank along the beach at Kodi – Kundapur for dumping crude stock of the Oil of Sardines along the beach. Fig. 3. Heap of gunny bags used for squeezing the Sardinesoil, dumped along the beach.

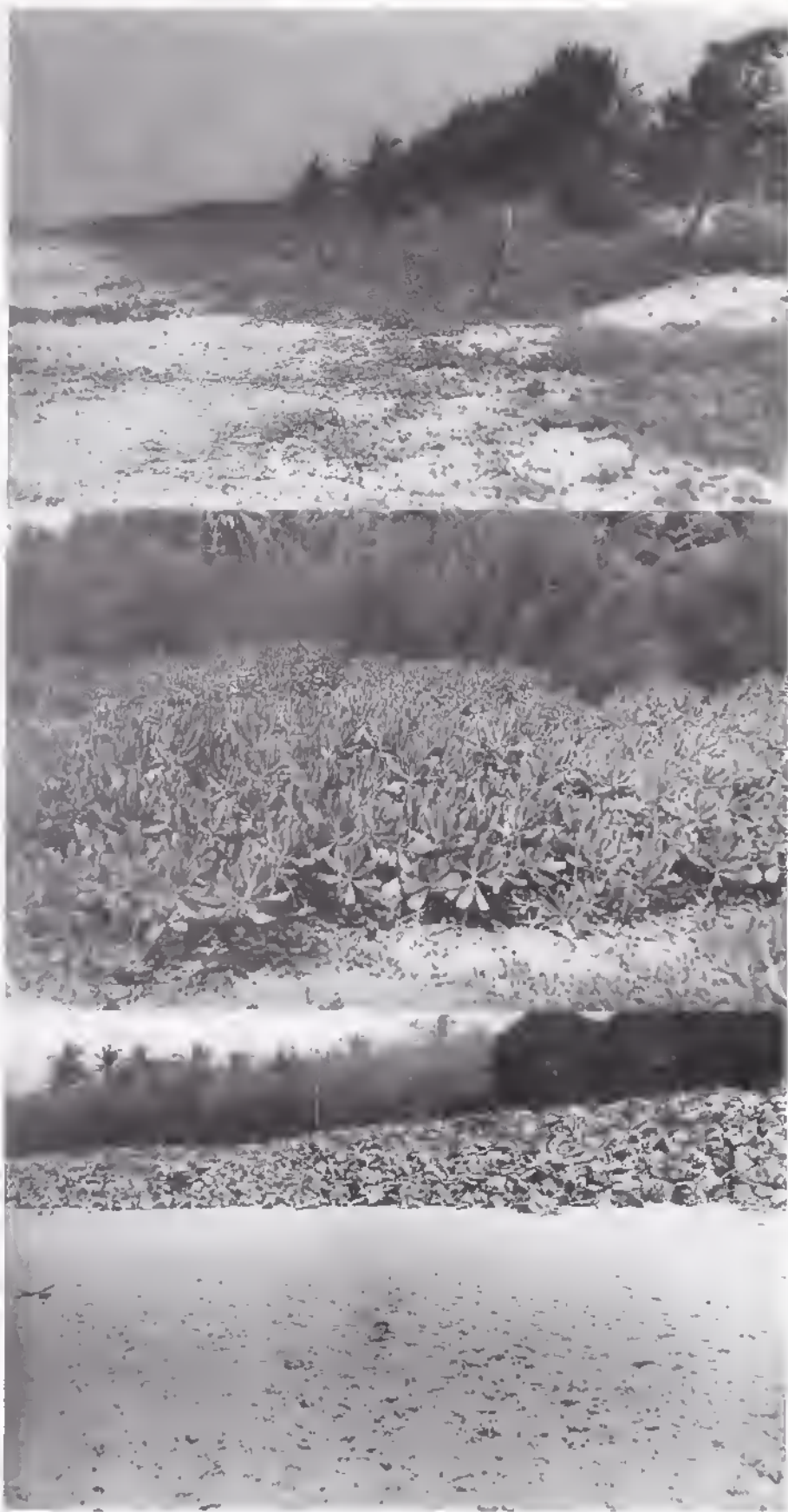


Plate 15 : Fig. 1. Backshore of Suratkal with consistent strand creepers like *Ipomoea pes-caprae*. Fig. 2. *Scaevola sericea* formation at Suratkal beach. Fig. 3. Sea-wall to keep off shore erosion at Udayavar bench.



Plate 16 : Figs. 1 – 4. Coastal occupational profile in respect of Limeshells mining in Dakshina Kannada and Udupi beaches.



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Plate 17 : Fig. 1. 'Guano-press' employed to extract the sardine oil, seen along one of the beaches of the Udupi coast. Fig. 2. Gunny bags containing dried non-oil yielding fish, used as farm manure being weighed to be sent to far off places. Fig. 3. Piles of dried fish packed in gunny bags. Ready for export.



Plate 18 : Fig. 1. Exposed boulders along the foreshore at Someshwar beach covered by *Enteromorpha* (Alga). Fig. 2. A twig of *Calophyllum inophyllum* with small white flowers, a common strand tree along the sandy backshore. Fig. 3. Fruit of *Pandanus odoratissimus*, a common strand plant along the backshore at Heble beach, Bhatkal taluk.

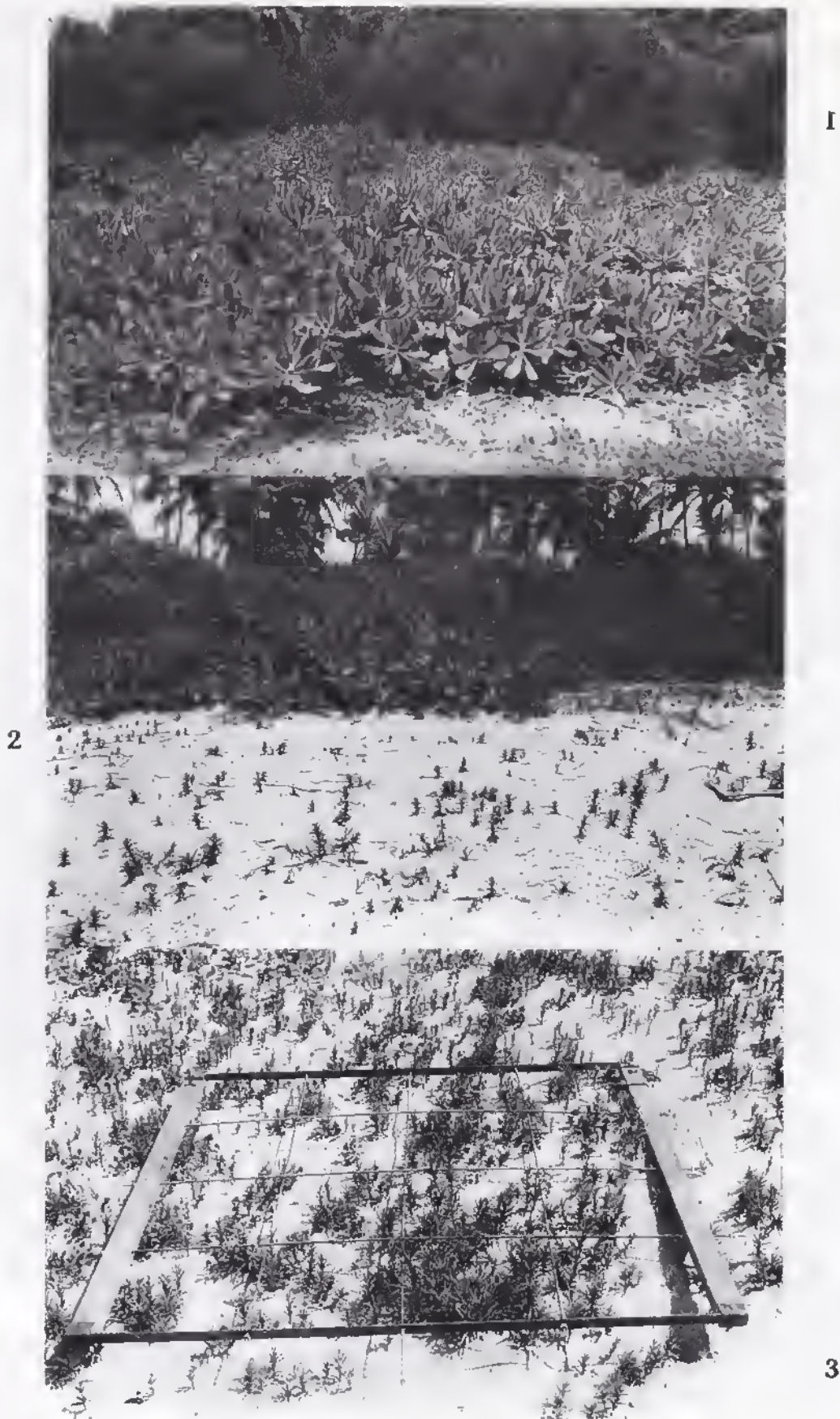


Plate 19 : Fig. 1. *Seaevola sericea* (Goodeniaceae) along the Suratkal - Kundapur beach. Fig. 2. *Remirea maritima* (*Cyperus pedunculatus*) Creeping rhizome, rooting at nodes common along the beaches of Karnataka. Fig. 3. Quadrat study on *Remirea maritima*.



Plate 20 : *Salvadora persica* bearing juicy fruits.



Plate 21 : *Scaevola sericea* with pale creamy zygomorphic flowers.



Plate 22 : *Scaevola sericea* stem bearing pith formation of commercial value.



Plate 23 : *Pandanus odoratissimus* bearing staminate inflorescence



The following books are available for sale. The price is indicated against the respective publications and a uniform discount of 15% will be allowed on each book.

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ABOUT THE AUTHORS



Dr. T. Ananda Rao, Ex. Deputy Director of the Botanical survey of India has been actively engaged in environmental and eco-centric issues, since his retirement in the year 1978. His field oriented research in respect of Bio-diversity, Orchids, afforestation and regeneration of Mangrovephytes and psammophytes coupled with EIA and EMP studies of international standards have attracted the attention of State and Central Governments. At present, he is a Scientist-in-charge in

the Karnataka Association for the Advancement of Science, Central College, Bangalore.

He has done collaborative research on Remote sensing with SAC (ISRO) and its application in monitoring Karnataka Coastal Environment. He has supervised fifteen research students for their Ph. D. work. He has authored 8 books and published over 200 papers in varied disciplines of Botany in National and International Journals. The continued field research work has already received much appreciation in the botanical circle. He is a recipient of Karnataka Environmental Research Award for 1997-1998.

Dr. A. N. Sherieff a product of Bangalore University, has associated with the Beach project work as a Co-worker. He obtained Ph.D. under the guidance of Dr. T. Ananda Rao. He has done extensive field work and collected invaluable data on Beach-Centric issues of Coastal Karnataka. Currently, he is pursuing research work in Australia.

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